

attended by persons carefully selected for the purpose and anxious to pursue a continuous course of study of an advanced standard. In these classes the Universities will be compelled to begin new subjects for students of matured minds who have not received the usual preparation, and will therefore necessarily deal with them in a new way. Here, if anywhere, the difference between school methods of teaching and University methods ought to be apparent; and I feel sure that, if University teachers attempt conventional methods with these students, they will be condemned to failure. It is certain that these classes will increase enormously and rapidly, and I have great hope that they will for this reason influence the methods of University teaching in a very healthy manner. In the tutorial classes the teachers will be confronted with the entirely new problem of students who have thought much, and of whom many are experienced speakers, well able to express their thoughts by the spoken word, but who, nevertheless, have received little training, and have had still less experience, in expressing their ideas in writing. Many of the students whom I have met have told me that this difficulty of writing is their real obstacle, and the matter in which they feel the want of experience most acutely. It will be a very valuable exercise for those who conduct these classes to instruct their students in the art of writing simple and intelligible English, and I hope that the necessity of giving this instruction will have a good effect upon the conventional methods of teaching English in schools as well as in Universities.

I am conscious that this address is lamentably incomplete in that it is concerned only with the manner of University teaching, and scarcely at all with its matter, and that, to carry any conviction, I should apply myself to the task of working out in detail the suggestions that I have made. But this would lead me far beyond the limits of an address, and I am content to do little more than touch the fringe of the problem. Reduced to its simplest terms, this, like so many educational problems, involves an attempt to reconcile two different aims.

The acquisition of knowledge and the training of the mind are two inseparable aims of education, and yet it often appears difficult to provide adequately for the one without neglecting the other. If childhood is the time when systematic training is most desirable, it is also the time when knowledge is most easily acquired; if early manhood is the time when special knowledge must be sought, it is also the time when training for the special business of life is necessary. To withdraw from the child the opportunities of absorbing knowledge may be as harmful as it is unnatural; to turn a young man or young woman loose into a profession without proper preparation is cruel, and may be disastrous.

And so we get the battle of syllabus, time-table, scholarships, examinations, professional training, technical instruction, under all of which lies the disturbing distinction between training and knowledge.

But, if we inquire further into these matters, I think we shall find that the fundamental question is to a large extent one of responsibility. Left to himself, a boy or a man will acquire a knowledge of the things which interest him, even though they be only the arts of a pickpocket, and will obtain a training from experience such as no school or college can give. If education is to achieve the great purpose of interesting and instructing him while young in the right objects, and also of training him for the proper business of his life before it is too late, is it not mainly a question of deciding when and how far to take for him, or to leave to him, the responsibility of what he is to learn and how he is to learn it? If the teacher bears the responsibility during the period of school training, should not the student have a large share of responsibility in the quest of knowledge at the University?

Now it is of the essence of responsibility that there should be something sudden and unexpected about it. If, before putting a young man into a position of trust, you lead him through a kindergarten preparation for it, in which he plays with the semblance before being admitted to the reality, if you teach him first all the rules and regulations which should prevent him from making a mistake, you will effectually smother his independence and stifle his initiative. But plunge him into a new experience and make him feel the responsibility of his position,

and you will give him the impulse to learn his new duties and the opportunity to show his real powers. It is because I feel that this sudden entrance into an environment of new responsibility is so necessary that I would regard with suspicion any attempt to provide a gradual transition between school and University methods.

In matters of discipline and self-control it is possible and advisable to place responsibility upon school children; in intellectual matters it is not advisable, except for the few who are matured beyond their years. It is, therefore, all the more necessary that this should be done at the moment when they enter the University.

This should be the moment of which Emerson says: "There is a time in every man's education when he arrives at the conviction that he must take himself for better or worse as his portion; that, though the wide universe is full of good, no kernel of nourishing corn can come to him but through his toil bestowed on that plot of ground which is given him to till. The power which resides in him is new in Nature, and none but he knows what that is which he can do, nor does he know until he has tried."

The spirit of independent inquiry, which should dominate all University teaching and learning, is not to be measured, as I have already said, by the number of memoirs published, but it is to be tested by the extent to which University students are engaged upon work for which they feel a responsibility. Visit the Universities at the present moment, and, in spite of all the admirable investigation which is being carried on, you will find the majority of students engaged in exercises in which they feel no responsibility whatever. In my opinion this indicates that for them the spirit of true University education has never been awakened. It is, after all, very largely a question of attitude of mind. Any subject of study, whether it be a scientific experiment or an historical event, or the significance of a text, is a matter of interpretation, and to approach it in the University spirit is to approach it with the question, "Is this the right interpretation?" Upon that question can be hung a whole philosophy of the subject, and from it can proceed a whole series of investigations: it embodies the true spirit of research and it opens the door to true learning.

In discussing University education I have not, of course, forgotten that many persons have taught themselves up to a University standard entirely without the aid of professors; indeed, the University of London long ago provided an avenue to a University degree which has been successfully followed by many such persons with the best possible results. But I have endeavoured to remind you that at the University, as at school, for most students the personal influence of the teacher is the important thing; that at the University, as at school, success in teaching depends mainly on the extent to which the interest of the student is aroused; and that at the University this is only to be done by providing him with a purpose and a responsibility in his work in order that he may understand to what conclusions it is leading him. Until this is done we shall still have University students complaining that they do not see the object of what they are learning or understand what it all means. This complaint, which I have often heard from past and present students of different Universities, suggested to me that I should on the present occasion deal with this defect in our customary methods.

In the hope that the attention of University teachers may be turned more fully to this aspect of their work have ventured to make it the subject of my address.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—At Emmanuel College research studentships of the value of 150*l.* each have been awarded to G. E. K. Brauholtz and A. Ll. Hughes. Grants of the following amounts have also been made:—S. Mangham, 60*l.*; R. H. Snape, 40*l.*; C. S. Robinson, 20*l.* The exhibition of 50*l.* offered to an advanced student commencing residence this October has been awarded to J. Ivon Graham, London, Royal College of Science for Ireland. Additional exhibitions of 30*l.* have also been awarded to A. J. Grove, Birmingham University, and F. Smith, Manchester University.

The Clerk Maxwell scholarship is vacant by the

resignation of Mr. Wellisch. Candidates are requested to send in their applications to Sir J. J. Thomson (the Cavendish Laboratory) on or before November 5.

At Trinity College the following have been elected into fellowships:—G. N. Watson, G. I. Taylor, H. T. J. Norton, and A. V. Hill.

OXFORD.—Dr. Arthur Vaughan, well known for his researches on the Carboniferous limestone, has been appointed lecturer in geology.

Mr. A. E. Richey has been appointed demonstrator in geology. Mr. Richey succeeds Mr. J. A. Douglas, who is now engaged on a geological expedition in Peru. The expedition has been sent out by Mr. W. E. Balston to take advantage, for geological research, of the excavations now in progress in the construction of new railways. Mr. Douglas is accompanied by Mr. Thomas, Rhodes scholar, who goes as a volunteer, and the general management of the expedition is undertaken by Prof. Sollas.

PROF. F. M. SANDWITH, Gresham professor of physic, will deliver four Gresham lectures on ancient and modern surgery on October 25 to 28. The lectures are free to the public, and will be delivered at the City of London School at 6 p.m. each evening.

THE China Emergency Appeal Committee asks for 100,000*l.* to be used as follows:—(1) 40,000*l.* for the establishment of union medical colleges; (2) 40,000*l.* for the establishment of educational schools of training; (3) 20,000*l.* in aid of literature societies and general translation work. A sum of nearly 14,000*l.* had been received or promised up to the end of August; and the following grants have already been made:—Union Medical College, Peking, 2000*l.*; Union Medical College, Hankow, 1000*l.*; Union Medical College, Moukden, 500*l.*; Union Normal Training College, Shantung University, 1500*l.*; Anglo-Chinese College, Tientsin, 1000*l.*; Christian Literature Society for China, 1700*l.*; China Medical Missionary Association for the Translation of Medical Literature, 300*l.* Donations towards the 100,000*l.* required for the China Emergency Fund may be sent to Mr. Robt. L. Barclay, honorary treasurer (Messrs. Barclay and Co.), 54 Lombard Street, London, E.C.; or to the Rev. Edward T. Reed, secretary, China Emergency Appeal Committee, 28 Victoria Street, Westminster, S.W. The committee has arranged for a meeting to be held in the Guildhall on October 18, when addresses will be given on the opportunity of the educational movement in China by Dr. S. L. Hart, and on medical education in China by Mr. D. Main. An address will also be given by Sir Robert Laidlaw.

THE inaugural address at the opening of the winter session of the Birkbeck College was this year delivered by Prof. M. E. Sadler. After sketching the development of English education during last century, and showing how much was accomplished by men like Birkbeck, Prof. Sadler went on to say that both in science and in art the passion of modern study has been to see and to represent things as they really are. This at bottom is the basis of scientific thought, and the purpose of the painter's and draughtsman's expression. To keep one's mind clear as a mirror is the intellectual and also the moral condition of real advance both in science and in art. It is impossible, however, to see things as they really are without a long preliminary discipline, in which one learns to see and how to express. Therefore one side of the modern educational movement is to prolong for all students the period of preliminary preparation and discipline, which, having been accomplished, the student may go to that freer, more self-active task which is before those who have received thorough training and preparation. It is in giving that thorough training and preparation that we in England, compared with other leading modern nations, have been until lately grievously in arrear. It is because our system of intermediate or secondary education is meagre, starved, sectional, that the immense efforts bestowed on technical and adult education by such men as Dr. Birkbeck failed for so long to produce the harvest which they confidently expected. The work of strengthening this period of disciplinary preparation for advanced studies—strengthening our whole system of secondary education—is one of the greatest tasks which are before us now as British citizens.

NO. 2137, VOL. 84]

SOCIETIES AND ACADEMIES. PARIS.

Academy of Sciences, October 3.—M. Émile Picard in the chair.—The president gave an account of the life-work of the late M. Maurice Lévy.—**Émile Picard**: A singular functional equation of the Fredholm type of equation. **Charles Lederer**: The organic compounds of tetravalent tellurium. By the interaction of tellurium tetrachloride and magnesium phenyl bromide in ethereal solution there is obtained chlorobenzene, diphenyl, the compound $\text{Te}(\text{C}_6\text{H}_5)_2$ already described by Kraft and Lyons, and a new derivative, triphenyl-telluronium chloride, the iodide of which, $(\text{C}_6\text{H}_5)_3\text{TeI}$, was prepared by adding potassium iodide. The bromide $(\text{C}_6\text{H}_5)_3\text{TeBr}_2$ is also formed in the reaction.—**L. Gay**: The osmotic equilibrium of two liquid phases.—**A. and L. Lumière** and **M. Seyewetz**: The action of quinones and their sulphonate derivatives on the photographic images formed by silver salts. Aqueous solutions of benzoquinone in presence of sulphuric acid are useful in reducing over-exposed negatives; the replacement of the sulphuric acid by potassium bromide gives a new intensifying solution. The suitable proportions are given in both cases.—**Charles Janet**: The sensitive organs of the mandible of the bee.—**Paul Godin**: Normal asymmetry of the binary organs in man.

DIARY OF SOCIETIES.

WEDNESDAY, OCTOBER 19.

ROYAL MICROSCOPICAL SOCIETY, at 8.—*Hicksonella*, a New Gorgonellid Genus: Jas. J. Simpson.—(1) On the Resolution of New Detail in a *Coscinodiscus asterophthalma*; (2) A Micrometric Difficulty: E. M. Nelson.

ENTOMOLOGICAL SOCIETY, at 8.

CONTENTS.

| | PAGE |
|---|------|
| The History of Physics | 457 |
| Psychiatry and Psychotherapy | 458 |
| Commercial Geography | 459 |
| Restorations of Extinct Animals. By R. L. | 459 |
| Hints for the Garden | 460 |
| Our Book Shelf | 460 |
| Letters to the Editor:— | |
| Early Burial Customs in Egypt.—Prof. G. Elliot Smith, F.R.S. | 461 |
| British Marine Zoology.—Prof. W. A. Herdman, F.R.S.; Prof. E. W. MacBride, F.R.S. | 462 |
| Hormones in Relation to Inheritance.—Prof. Gilbert C. Bourne, F.R.S. | 462 |
| Pwdr Ser.—Prof. T. McKenny Hughes, F.R.S. | 462 |
| Unemployed Laboratory Assistants.—G. E. Reiss | 462 |
| The International Union for Cooperation in Solar Research. By Prof. Arthur Schuster, F.R.S. | 462 |
| Popular Books on Biological Subjects. (Illustrated.) | 464 |
| The Geology and Archaeology of Orangia. (Illustrated.) By J. W. G. | 465 |
| Sport on the Moors and Broads. (Illustrated.) By R. L. | 466 |
| Dr. John Peile | 467 |
| Notes | 467 |
| Our Astronomical Column:— | |
| Announcement of a Nova | 472 |
| Time of the Solar Transit of Halley's Comet | 472 |
| Observations of Comet 1910a | 472 |
| Arabian Astronomical Instruments | 472 |
| New Ephemerides for Saturn, Uranus, and Neptune | 472 |
| Irregularities in the Motion of Algol's Satellite | 472 |
| The Cambridge Observatory | 472 |
| Observations of Neptune's Satellite | 472 |
| Some Recent Studies on Fossil Plants. (Illustrated.) By E. A. N. A. | 473 |
| Forthcoming Books of Science | 475 |
| The International Congress on Radiology and Electricity. By W. M. | 478 |
| The Opening of the Medical Session | 479 |
| The Berlin University Centenary | 480 |
| The British Association at Sheffield. | |
| Section L.—Educational Science.—Opening Address by Principal H. A. Miers, M.A., D.Sc., F.R.S., President of the Section | 480 |
| University and Educational Intelligence | 487 |
| Societies and Academies | 488 |
| Diary of Societies | 488 |